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An Evaluation of the Effectiveness of an Asthma Educational Initiative in a Rural Clinic

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An Evaluation of the Effectiveness of an Asthma Educational Initiative In a Rural Clinic

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Regis University

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Executive Summary
An Evaluation of the Effectiveness of an Educational Initiative in a Rural Clinic

Problem

According to the American Lung Association (2011), approximately one third of the children hospitalized in the state of Colorado are due to asthma. In fact, almost 75% of admissions for asthma are avoidable, and potentially preventable factors are common in deaths from asthma. Asthma is a chronic disease that can be managed through education, medication, and avoidance of triggers. The PICO question this capstone project seeked to address was: In (Population) parents of children clinically diagnosed with asthma in a rural clinic, will (Intervention) an evidence-based educational intervention related to asthma management when compared (Comparison) with the current practice of asthma treatment, result (Outcome) in enhanced parental asthma knowledge and asthma management in children diagnosed with asthma measured by a self-assessment questionnaire?

Purpose

The purpose of this project was to provide an evidence-based educational intervention in a family practice clinic to the parents of children diagnosed with asthma.

Goal

The goal of this capstone project was to improve parental knowledge, awareness, and asthma management in children with asthma.

Objectives

Objectives of the capstone project were to evaluate 1) the effects of an individualized education program for the parents who have children with asthma in a clinic setting, 2) to measure asthma control and self-management skills at baseline and post-education implementation, and 3) to develop an asthma educational teaching plan for the parent, patient, and family members.

Plan

The capstone project began in the fall of 2012 with the problem recognized, followed by the completion of a needs assessment, theoretical foundation, and an extensive review of literature. Upon approval from the Regis University IRB and permission to use the instrument tool, the project was implemented in March 2014 with data collected to determine if the educational intervention improved parental and patient asthma awareness, control, and self-management using the ATAQ questionnaire. Posing the question whether an asthma educational initiative reduced the number of asthma attacks was analyzed using the independent samples t-test.

Outcomes and Results

Between March 2014 and June 2014, 52 parents of pediatric asthma patients were approached to enroll in the study. Of those, 2 participants did not complete the study, 4 did not meet the study criteria, and 8 declined to participate for a total n=38. Asthma educational outcomes and the ATAQ scores pre and post intervention showed significant improvement in the level of asthma awareness, inhaler technique, control and management (ATAQ pre-intervention p=0.047, post-intervention p=<0.001), asthma attacks pre-intervention p=0.452 and p=<0.001 post-intervention. There was clinical significance in improvement noted with medication adherence pre and post intervention. In addition, there were no ED or hospital visits during the study time frame. This study determined that an outpatient education program for asthma patients improves the level of asthma control and self-management.

Acknowledgement

My deepest gratitude is to my son Matthew and fiancé Gary for being by my side throughout the entire doctorate program. Without their patience, love, and support I would not have been able to complete this journey. To my sisters Pamela and Linda; thank you, for always believing in me, encouraging me in all my pursuits, and inspiring me to follow my dreams.

I will forever be grateful to the DNP faculty at Regis University for sharing their knowledge and words of wisdom. Dr. Colleen McCallum, without your invaluable support and guidance, this project would not have been possible.

Finally, I would like to dedicate this project to my mother Millie and my father Dave. Although you are not here, your spirit has given me the strength to succeed as a mother and a lifelong learner. I did it, a doctorate degree. This is for you!

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An Evaluation of the Effectiveness of an Asthma Educational Initiative in a Rural Clinic

The Global Initiative for Asthma Management (GINA, 2013) recognizes asthma as a serious global health problem. People of all ages in countries throughout the world are affected by this chronic airway disorder that, when uncontrolled, can place severe limits on daily life, increase healthcare costs, and is sometimes fatal. The particulars propose a call for interventions to facilitate individuals, families, communities, and healthcare providers to control asthma and its outcomes efficiently. Currently, the clinic setting where this capstone project was implemented offers inconsistent asthma education, often resulting in unnecessary healthcare costs due to emergency department (ED) visits, hospital admissions, and an increase in clinic visits for asthma. The factors influencing missed opportunities to give the parent and patient any means of education include a critical shortage of nursing staff and providers, outdated educational materials, and a staffing mix with novice nurses and medical assistants who are unfamiliar and or uncomfortable with any form of teaching. The vulnerable populations in this valley are challenged with a multitude of barriers to healthcare, leading to a higher prevalence of illness and disease such as asthma. The primary investigator believed that an evidence-based asthma education initiative could improve asthma outcomes, self-management skills, and unnecessary healthcare costs related to asthma. This capstone project was designed to measure asthma outcomes before and after an asthma educational initiative in a rural clinic setting.

Problem Recognition and Definition

Statement of Purpose

The National Heart Lung and Blood Institute (NHLBI, 2012) defines asthma as a chronic lung disease that inflames and narrows the airways. In an attack, the lining of the passages swell, causing the airways to narrow and reduces the flow of air in and out of the lungs. Asthma causes

reoccurring periods of wheezing, chest tightness, shortness of breath, and coughing, all of which vary in severity and frequency from person to person (World Health Organization, 2012). According to the NHLBI (2012), asthma affects people of all ages; however, it mainly begins in childhood. In the United States, more than 25 million people are known to have asthma; approximately seven million of these people are children (NHLBI, 2012). The primary purposes of this capstone project were to identify the significance of asthma in clinically diagnosed children five through 17 years of age in a rural clinic, to develop clinical strategies to improve asthma management by implementing an evidence-based educational program specific to parents of children with asthma, and to measure the impact of the educational intervention with a self-assessment questionnaire.

Problem Statement

The American Lung Association (2011) noted that approximately one third of hospitalizations for children are due to asthma. In fact, almost 75% of admissions for asthma are avoidable, and potentially preventable factors are common in deaths from asthma. Asthma is a chronic disease that can be managed through education, medication, and avoidance of triggers. However, many children with asthma and their families are unaware of their "triggers," and despite the various drugs available, asthma is still poorly controlled. Due to time constraints that family practice providers and pediatricians face when seeing patients in the exam room, they may not be able to provide all of the necessary asthma management education. Initially, when information is given, it often consists of information that the healthcare professional thinks is needed rather than information that the patient needs or desires. This information is often dispensed as an afterthought and in a haphazard way. For many providers, the paradigm has been "diagnose and adios," with no emphasis on education (Nicholas et al., 2009). Frequently,

providers are unable to determine if the patient understands the information that they were provided. If the patient does not return for follow-up care, providers cannot determine whether or not the recommendations are being carried out. Providers tend to assume that the patient will follow their directives, and when they do not, providers have a tendency to label patients as noncompliant, uncooperative, or worse (Sanford, R., 2000). The goal of asthma management is to achieve and maintain disease control. However, despite the implementation of guidelines for asthma management around the world, along with the availability of highly effective drugs for controlling symptoms and for treating the underlying inflammatory process, asthma remains a poorly controlled disease.

Project Significance, Scope and Rationale

The paradox of asthma is that, even if provider knowledge of its' pathophysiological characteristics and the current treatment for the disease have improved considerably over the past two decades, the prevalence of asthma, the healthcare use connected with it, and alterations in functional status that result for the patient, family, and their community life, have not declined significantly worldwide (Clark et al, 2009). Medical care to treat asthma in the United States costs approximately thirty-three hundred dollars per person with asthma each year (Centers for Disease Control and Prevention, 2012). Children and adults living in this particular valley in the state, encounter considerable burden and morbidity related to respiratory problems that are costly to an individual and community as a whole. According to National Jewish Health (2012), children in this rural setting of the state are a majority impacted by asthma. In the two counties served in this area of the state, 13% of children six through 11 years of age have been diagnosed with asthma by a health care provider with 40% being uninsured (National Survey of Children's Health, 2010). The scope of this project is to analyze the impact of asthma in children five

through 17 years of age in a rural clinic, and to develop an evidence-based educational program specific to the parents of these children. The goals of the project are aimed at improving asthma control and outcomes, and to decrease the number of ED visits, hospital admissions, and avoidable healthcare costs related to asthma.

PICO

This project is an evidence-based practice (EBP) project in which a quality improvement plan, program evaluation, educational, or standard of care intervention will be completed. In most cases, a pre-test and post-test evaluation will assess the effect of the intervention. The project will be internal to an agency and will inform the agency of issues regarding health care quality, cost, and patient satisfaction. The results of this project are not meant to generate new knowledge or be generalizable across settings but rather seek to address a specific population, at a specific time, in a specific agency. These projects translate and apply the science of nursing to the greater health care field.

Projects utilize the acronym "PICO", rather than stating a formal research hypothesis. The acronym stands for: Population or Disease (P), Intervention or Issue of Interest (I), Comparison group or Current Practice (C), and Outcome (O) and is usually framed as a question (Melnyk and Fineout-Overholt, 2011, p. 31). The evidence-based study question this project seeks to address is: In parents of (P) pediatric patients clinically diagnosed with asthma, (I) will a focused asthma educational plan for parent, patients and their family, (C) in comparison to the current treatment of asthma result in (O) better outcomes as evidenced by improved asthma management and control measured by a self-assessment questionnaire?

P: Parents of children five-17 years of age with a clinical diagnosis of asthma seen in a rural clinic

I: An evidence-based asthma educational plan in a rural clinic using the clinical practice guidelines set forth by the National Heart Lung Blood Institute

C: Current practice of asthma treatment

O: Improved asthma management measured by a self-assessment questionnaire

Theoretical Foundation

The theoretical foundation for this project is based upon Albert Bandura's Social Cognitive Theory (SCT), one of the most influential theories of learning which postulates the importance of cognitive processes in the changing of behavior (Toomey & Alligood, 2006). According to Bandura (2004), SCT posits a multi-faceted causal structure in which self-efficacy beliefs work simultaneously with goals, outcome expectations, perceived environmental barriers, and facilitators in the regulation of human motivation, behavior, and well-being. In addition, SCT specifies a core set of determinants to include knowledge of health risks and benefits of diverse health practices, a perceived self-efficacy indicating self-control over one's health habits, outcome expectations regarding the expected costs and benefits for various health habits, the health goals people establish for themselves, and the particular plans and strategies for achieving them, including the perceived social and structural obstacles to the changes that they seek. SCT offers both predictors and principles on how to inform, facilitate, direct, and motivate people to modify habits that promote health and diminish those that impair it. The Social Cognitive Theory is relevant for designing health education and health behavior programs. This theory explains how people acquire and maintain certain behavioral patterns. The theory can also be used for providing the basis for intervention strategies. According to Bandura, a wide range of health interventions have demonstrated that increasing people's self-efficacy expectations related to specific health behaviors leads to improvements in their health behaviors and outcomes. This

proposed capstone project faced minimal challenges of moving towards a theory model reflective of a change process aimed at improving asthma outcomes in a diverse pediatric population. This theory helped guide the project by enhancing the knowledge of the staff, patients, and the parents on the basics of asthma and self-care management. The nursing staff embraced the knowledge learned and the parent strived to reach the goals identified without any hesitation.

According to Kearsley (2010), Knowles' theory of andragogy is an attempt to develop a theory specifically for adult learning. Knowles emphasizes that adults are self-directed and expect to take responsibility for decisions. Adult learning programs must accommodate this fundamental aspect. Andragogy makes the following assumptions about the design of learning: (1) Adults need to know why they need to learn something (2) Adults need to learn experientially, (3) Adults approach learning as problem-solving, and (4) Adults learn best when the topic is of immediate value. In practical terms, andragogy means that instruction for adults needs to focus more on the process and less on the content being taught. Strategies such as case studies, role playing, simulations, and self-evaluation are most useful. Instructors adopt a role of facilitator or resource rather than lecturer or grader. Kearsley (2010) provides an example (see Appendix A) of applying andragogy principles to the design of an educational initiative: 1) there is a need to explain why specific things are being taught, 2) instruction should be task-oriented instead of memorization -- learning activities should be in the context of common tasks to be performed, 3) instruction should take into account the wide range of different backgrounds of learners, and 4) since adults are self-directed, instruction should allow learners to discover things for themselves, providing guidance and help when mistakes are made (Kearsley, 2010). Following a theory-based design on how to engage the adult learner with the education given with this project, will most definitely influence the educational outcomes of each individual

parent. Offering hands-on training captured the attention of the parent, who in return, appeared more confident in demonstrating how to recognize an asthma episode, set up a nebulizer, instruct the child on inhaler technique, and the role of all medications prescribed.

Literature Review and Scope of Evidence

According to Houser & Oman (2011), a systematic approach to critically grade the quality or level of evidence and strength of practice recommendations is vital in making appropriate judgments regarding clinical decisions. A comprehensive systematic search of all available peer-reviewed literature dated years 2002-2013 and related to the management of asthma in children five through17 years of age was conducted through the Cumulative Index to Nursing and Allied Health Literature and PubMed. The search words included children with asthma, asthma management in children, asthma education and outcomes, and theories in asthma management. To date, 127 articles from peer-reviewed journals have been reviewed, with a total of 30 articles used for this evidence-based project to include 10 randomized control trials, one meta-analysis, one regressive analysis, one quantitative study, four quasi-experimental, two cohort, and five descriptive studies. The literature that this proposal referenced was guided by the seven-tiered levels of evidence in a structured table seeking the highest form of evidence related to the capstone project PICO question (Houser & Oman, pg 141).

Review of Evidence

Background of the Problem

Poor patient outcomes have been associated with a lack of patient and parent compliance with the patient's individualized treatment plan. There are a number of possible factors that may play a role in patients' and parents' noncompliance. They include financial and cultural barriers, and parents' and patients' misconception about the disease process and the importance of

treatment (Gillissen, 2007). One significant factor that leads to noncompliance and poor outcomes is inadequate education by providers for pediatric patients ages two through 17 years of age and or their parents, regarding the diagnosis of asthma and the importance of strict adherence to the treatment plan.

GINA (2013) discussed the barriers to quality asthma care for children that included lack of asthma education and management, lack of health insurance coverage, poor physician continuity of care, patient and family health beliefs, and communication barriers between providers and patients, resulting in increased healthcare costs without decreasing healthcare disparities. According to Ahmad & Grimes (2011), management of asthma requires a mastering of several tasks including identifying symptoms of an impending attack, identifying and avoiding triggers, proper and consistent peak flow technique, and correct usage of maintenance and rescue medications. Effective patient and family education is an important component in the mastery of these self-care skills (Ahmad & Grimes, 2011). Camargo et al, (2007) noted that the presence of nurse educators in the clinical setting could possibly afford a way to enhance communication with patients and their family members during their scheduled appointments. Due to high patient ratios per provider, a significant number of providers in the clinical setting do not have the opportunity to give the asthma management education that is needed by the patient and family. Empowering and training the clinic nurses to meet individually with the parent and patient following a clinical visit would facilitate a more inclusive conversation focused on asthma management and trigger control. The objectives of this project were to evaluate the effects of an individualized education program for the parents of children with asthma in a clinic setting, and to measure asthma control and self-management skills at baseline and post-education

implementation. This nurse-led intervention has the opportunity to positively impact a population burdened with asthma and associated healthcare costs.

Review of the Literature

Several studies were relevant to this capstone project. In a randomized controlled (RCT) trial by Zorc et al (2009), an educational intervention was designed and conducted in an ED setting aimed at addressing beliefs and barriers to follow-up asthma care. The goal of the study was to see if the interventions implemented would improve follow-up rates with a primary care provider (PCP) within four weeks of the intervention. The authors noted that the control group (n=126) of children aged one-18 years with a diagnosis of asthma: 1) received a letter to take to their primary care provider (PCP) for persistent asthma symptoms and a letter to remind the parent and or patient to schedule a follow-up appointment with their PCP, 2) copies of the ED medical record were faxed to the patients' PCP, 3) the parent and patient viewed a video on the importance of asthma control with highlights on the communication between the PCP, patient, and family members, 4) a reminder to follow-up with the PCP was mailed to all participants, and 5) all participants were contacted via telephone at one, three and six months post-intervention. The authors found that the interventions did not have a positive impact on follow-up care with the PCP and the educational intervention should be modified to include self-efficacy building strategies to promote enhanced self-management. Additionally, the exclusion of non-English speaking children and the time frame the intervention was offered, limited the potential results of the study.

Testing an Intervention to Promote Children's Adherence to Asthma Self-Management, a RCT by Burkhart et al, (2007) tested the hypothesis that asthma education would show a higher adherence to peak expiratory flow (PEF) monitoring and report fewer asthma episodes in

children aged seven to 11 with persistent asthma. Both the intervention and control groups received instruction on PEF monitoring; only the intervention group received asthma education, self-monitoring, contingency plan management, cueing, and reinforcement. The authors concluded that the intention to teach children to adhere to the recommended regimen for the management of their asthma at home was significantly effective. The paucity of theory-based research shows the need to design studies based on theoretical models for building knowledge to predict or explain children's adherence behaviors.

McCarthy et al., (2002) discussed the importance of empowering patients through asthma education. This quasi-experimental study compared the outcomes for parents who participated in an educational intervention focused on empowering and traditional approaches to asthma education. Outcomes specific to the study included a) knowledge, b) sense of control, c) ability to make decisions, and d) ability to provide care. The implications of the findings suggested that the empowering approach to asthma education made a significant difference in the sense of control and the ability to make decisions about what to do when the child's asthma worsened. Moving from a traditional to an empowering approach represents a paradigm shift for healthcare. The study clearly indicates that the empowering approach utilized by the parent will significantly impact healthcare outcomes in children with asthma. Empowering not only the patient but the family and healthcare team to be involved in care, management, and outcomes is of utmost importance. The ultimate message in this particular study was that the patient did not feel 'singled-out or viewed differently' due to an illness.

The purpose of a two-year descriptive study using qualitative and quantitative data by Frost & Daly (2010), was to describe the views of children's asthma care in a primary setting and the support for a nurse-led asthma educational initiative. Methodology included a 17-item

questionnaire disbursed to 541 general practitioners (GP's) in reference to children's asthma management, nurse-led provisions, and attitudes towards nurse-led services. Overall, 89% of the GP's believed that patients would benefit from a nurse-led asthma initiative as evidenced by a decrease in asthma exacerbations, decreased clinic visits, and improved asthma awareness.

Two studies discussed by the NHLBI (2007) reflect on the impact of an educational intervention demonstrated on asthma management: A meta-analysis of 32 controlled trials of educational interventions for self-management in children and adolescents were looked at, involving 3,706 patients. This meta-analysis showed the significant effects of education in improving the child's self-efficacy and lung function, as well as in reducing days with restricted activity, school absences, and ED visits. A randomized controlled trial of education that merged group sessions, individual meetings, and having the family accompany the patient during doctor visits both decreased the frequency of symptoms and activity restriction; it also showed an increase in the families' ability and confidence to self-manage asthma. These studies provide strong evidence for the benefit of providing structured self-management education to children who have asthma, as well as their families in conjunction with ambulatory care for asthma (NHLBI, 2007, pg 101).

Overall, the themes identified in the literature indicated that 1) asthma education improved follow-up care with the PCP, 2) asthma education decreased ED visits for asthma, 3) post-asthma education increased awareness of triggers, greater perceptions of asthma susceptibility, and misconceptions regarding asthma, 4) asthma education increased parental sense of control and confidence in making decisions about what to do when the child's asthma started and or worsened, and 5) a high prevalence of childhood asthma indicates a need for education by trained health educators in an effort to improve the management of asthma in

children (NHLBI, 2007). Education is a powerful tool and has proven to impact the overall outcomes of the pediatric population with asthma. Identified gaps in the literature include small sample size, inclusion of English speaking participants only, and studies performed mainly in metropolitan communities.

Project Plan and Evaluation

Need

The particular valley that this capstone project was being performed in is geographically isolated in the rural southern portion of the state, and is amongst the poorest counties in the state. According to the County Health Rankings and Roadmaps (2012), the percentage of the uninsured in this particular county is 21%; the poverty level is at 29%, compared with the National Benchmark of 13%; the patient ratio to primary care physicians is 858:1; and an estimated 47.6% of children in this valley have public health insurance such as Medicaid or this state's health initiative program, compared to 40.6% for the rest of the state (2012). People living in a rural area often lack the availability of healthcare resources, such as those found in a metropolitan location. The people of this valley are at risk for health disparities due to many reasons: high poverty levels, high Hispanic population, rural location, low socio-economic status, health risk behaviors, and being medically underserved. The population in this valley could also be described as economically challenged, as the median income for a household in this county averages $38,299, while the median income for a family in the US averages $47,163 (2012). According to the US Census Bureau (2013), approximately 16.4% of this valley's residents live in poverty, which is higher than the national benchmark of 13% (US Census Bureau, 2013). Poverty in this valley poses a multitude of barriers to healthcare such as transportation, language barriers, and access to care, resulting in unfavorable healthcare

outcomes. As discussed by Brown et al. (2004), children of low-income families and minority children, particularly those using Medicaid insurance, are more likely to have asthma, and they are less likely to receive optimal medical care. These children have been shown to receive fewer preventive asthma medications and to use more ED and inpatient services for the treatment of acute asthma exacerbations. A low level of use of or lack of controller medications, and more frequent need for emergency services obviously increases the total healthcare costs.

Living in a rural area, serving a diversified underserved, underinsured, and non-insured population, can be challenging. Access to care and health disparity are issues that have been sabotaging the health of the American people for over a century. To demonstrate outcomes and rural concerns, a 2007 Behavioral Risk Factor Surveillance Survey (BRFSS) conducted by the Centers for Disease Control and Prevention (CDC), showed that those living in rural areas reported fair or poorer health compared to those living in urban geographical locations (Moiduddin, et al., 2009). Rural areas tend to have a proportionately poorer and larger indigent population that depends upon the public health services or EDs to treat non-acute and non-emergent conditions, that otherwise could have been treated in the outpatient setting. When health needs are delayed, a minor medical issue can ensue into an acute condition necessitating an ED encounter, inpatient admission, or a highly expensive medical air flight to a facility with a higher level of care. Despite the generally greater healthcare needs of rural residents, they typically have fewer available resources and more difficulty accessing healthcare. These characteristics are likely to contribute to healthcare differences experienced by rural individuals. Overall, disparities in health status and increased death rates from chronic conditions, such as asthma, are clearly evidenced in this sector of the population.

Market Risk Analysis

The Centers for Disease Control and Prevention (2013) noted that most people can control their asthma and live symptom-free. Some factors that can help people control their asthma include regular access to care, knowledge about how to use prescribed medications, and skills to modify the environment to reduce or eliminate exposure to allergens and irritants. These measures are reinforced by the most current, nationally-recognized guidelines developed by the National Asthma Education and Prevention Program (NAEPP, 2007). Yet, the latest research indicates that many people with asthma are not receiving care based on the NAEPP guidelines, and many are not receiving regular asthma care.

Over 145 million people live with chronic medical conditions such as asthma; this number is projected to increase nearly 20% by the year 2030, resulting in an estimated chronically ill population of 171 million (County Health Rankings, 2012). According to the Centers for Disease Control and Prevention (2012) in the last decade, the proportion of people with asthma in the United States grew by nearly 15%, with an identified seven million children and 18.7 million adults who had asthma; 479,300 hospitalizations, 1.9 million emergency department visits, and 8.9 million doctor visits were all related to asthma (2012). Clearly, the above *driving forces* indicated a need to implement an asthma educational initiative in a rural clinic.

Project Strengths, Weaknesses, Opportunities, and Threats

The strengths, weaknesses, opportunities and threats (SWOT) analysis (see Table 1) was utilized to initiate the proposed implementation of an asthma educational program serving the underserved pediatric population diagnosed with asthma in a rural clinic. According to Fortenberry (2010), the SWOT analysis provides vital information that is necessary for monitoring in-progress performance and determining future strategic and tactical pursuits (2010).

The SWOT analysis of this capstone project offered insight into the *strengths* and *weaknesses* in the internal environment, and also the *opportunities* and *threats* posed in the external environment (Fortenberry, 2010). By understanding the four aspects of the project's situation, the project planner can better leverage its' strengths, correct its' weaknesses, capitalize on golden opportunities, and deter potentially devastating threats (NetMBA, 2013).

The project *strengths* of the DNP project serve as a foundation for building competitive advantage and are positive product and product-related attributes such as seasoned nursing staff, on-site education using EBP guidelines, fluent Spanish and Kanjobal interpreter, collaborative agreement with National Jewish Health (NJH), and evidence-based practice materials. Implementing the educational initiative at the time of the clinic visit was a strength in itself, as the parent and patient received face-to-face communication with the primary investigator and lead nurse in a non-rushed environment. It was imperative to assess the health literacy of the parent and child during the initial phase of the education initiative, as several parents and patients presenting for care at the clinic did not know how to read or write. The educational initiative was modified to meet their educational needs with return verbalization of what they heard and understood. The areas of *weakness* in the project were the attributes that had the potential to negatively impact the project such as staff buy-in, lack of time to complete the study, and staff buy-in on the importance of implementing and maintaining the educational initiative. With a shortage of providers, access to care for all patients seeking care was a barrier prior to, and during the project intervention. *Restraining forces* of the project included the continuation of the project by the Lead Nurse of the clinic in an effort to uphold the standard of education offered to the parents of children with asthma. There is a possibility that the future of the project will not be followed by the staff due to attrition and or lack of motivation. The level of staffing mix may

also alter the ability to continuously follow the educational intervention on a daily basis. *Opportunities* offer the chance to introduce a new product or service that can generate superior returns (Fortenberry, 2010). The project opportunities identified were to provide evidence-based asthma education in other clinical settings, decrease healthcare costs, community collaboration, and improve parental asthma knowledge and management. *Threats* identified by Fortenberry (2010) are external events and circumstances that have the ability to negatively influence products. The asthma educational project was challenged with patient attrition, access to care, and competition with local clinics.

Sustainability

Numerous population-based appraisals exhibit that overall asthma control remains poor, and an understanding about asthma management amongst both physicians and patients continues to be less than favorable (Nicholas et al., 2009). Implementing an asthma education program in the clinical setting was focused on meeting the patient's health care and educational needs. Potential risks and unintended consequences to the project were directed toward the parents of the child diagnosed with asthma: lack of motivation to be educated, missed appointments, anxiety, health literacy impediment, denial of the asthma diagnosis, lack of follow-up to a specialty provider if a referral is made at the clinic, and parent and or patient attrition from the study. Effective patient and family education is an important component in the mastery of these self-care skills. Without asthma education available in the clinic, the parents (s) and patients needing education on asthma management will receive minimal to no education, linguistic and cultural needs may not be met, asthma management is not managed, controlled or understood, and continuity of care is interrupted. The consequences will ultimately interfere with any opportunity to improve the health status of the patients burdened with asthma.

Evidence-based literature demonstrates the need to serve a population diagnosed with asthma, thus, the long-term sustainability of this asthma educational initiative project will be influenced by the outcomes measured in the short timeframe of this project. The impetus to educate parents and the children with asthma in the clinic setting must be mandated in an effort to improve asthma healthcare outcomes. The providers in the clinic where this project took place clearly identified the need to be re-educated on asthma management, control, and outcomes to effectively deliver evidence-based health care to the parent (s) and children with asthma. In a short amount of time, this capstone project has demonstrated a favorable impact on the pediatric population with asthma served in the valley. The trends reported support studies that indicate asthma education to parents positively impacts asthma-related outcomes in children. The internal and external stakeholders are committed to the sustainability and success of the project and the favorable impact the project will have on the pediatric population with asthma served in the valley.

Resources

Healthcare resources are available throughout all six counties in the valley. Three local hospitals offer access to care. The largest medical center, a level IV facility with 84 licensed beds is located in the most populated town. A variety of services are offered only at this medical center: oncology, cardiac rehabilitation, intensive care unit, orthopedic care, a six-bed operating room, internal medicine, pediatric care, twenty-four hour hospitalist, and diabetic education. Although this facility is not-for-profit, the ability to obtain radiology and surgical services requires a down payment from the insured and uninsured. Eligibility specialists are available Monday through Friday to assist those in need of medical care without insurance coverage according to income status. Options for coverage include enrollment into Medicaid, the state

health indigent plan, migrant program, and monthly payment options. Both of these counties have hospital services with full laboratory, radiology, emergency department and in-patient units. Any complicated cases are typically transferred to this larger facility or out of the valley. Clinical services are offered in all counties, with access to a primary care provider being limited due to an influx of scheduled appointments and a shortage of providers. Services offered in all clinics include physical therapy, dental, and women's health. Other valuable resources in this county include public health, hospice, a homeless shelter, home health care, Planned Parenthood, and behavioral health services. Continued collaboration with external stakeholders will help expand and maintain this asthma educational project valleywide. Several resources were utilized prior to and following the implementation of this project.

Stakeholders and Project Team

Stakeholders are key individuals who will be affected one way or another by the project (Zaccagnini & White, 2010)**.** The project team consisted of the primary investigator, the primary investigator's mentor, clinic manager, lead nurse, and support staff members. Internal stakeholders of the project are the executive team members, providers, medical assistants, and case management. The Chief Medical Officer and National Jewish have sought to coordinate evidence-based education for all providers and nursing staff on asthma management and spirometry use to enhance the assessment and treatment for the children with asthma. The primary investigator will continue to collaborate with all stakeholders (see Table 2) in an effort to educate the group on the importance to continue the project and maintain sustainability. The voice and commitment of each stakeholder will play a vital role in the future success of this project.

Cost-Benefit analysis

According to Plowman (2013), a cost-benefit analysis is used to evaluate the total anticipated cost of a project compared to the total expected benefits in order to establish whether the proposed implementation is worthwhile for an organization or project team. A cost-benefit analysis has three parts: 1) identifying costs; 2) identify benefits, and 3) evaluating the costs and benefits. Subtracting all identified costs from the expected benefits will determine whether the positive benefits outweigh the negative costs (Plowman, 2013). As discussed by Zaccagnini and White (2011), a cost-benefit analysis is a powerful tool that demonstrates that the benefit of solving a specific problem is worth the cost of undertaking a project. Through strategic planning, an organization is able to plan, implement and control the allocated budgets approved to each medical and business unit. The budget is one of the most significant documents of a healthcare organization and serves as a planning document that identifies the revenues and resources needed for an organization to achieve its goals and objectives (Zelman, W., et al, 2009).

The total cost to implement this project included the items provided to the primary investigator free of cost which included: portfolios with asthma educational materials, spacers, a training room, and the training of nursing-provider staff on asthma management. There was not a need to increase nursing staff, locate a conference room, or seek out pharmaceutical companies for spacers. The capstone project budget costs were compared with the actual budget project costs to implement this asthma educational project in a rural clinic setting (see Table 3). With the majority of items donated by the organization, the capstone project costs were estimated in the amount of $562. The cost to start the same educational project in another clinic would not exceed in the amount of $562, unless a nurse educator was hired.

Often, the underserved, uninsured populations do not have the ability to see a physician, resulting in a delay in follow-up care, lack of continuity of care, and an increase in the severity of illness resulting in increased medical costs for an emergency department (ED) visit, hospital admission, or a transfer out of the valley to a higher level of care resulting in higher medical costs. The minimal cost to be flown out of the valley is $25,000 and the minimal cost is $5000 via ambulance; ED visits are estimated at $2800 for each visit; and a hospital admission averages a daily minimum cost of $4200.

Medications to treat asthma are costly and often leave the insured and uninsured patient without their medication due to financial constraints. Although several private and public healthcare programs were available to ensure that children received medical care, many ethnic and racial minorities struggled to pay for the medicines that they needed. More than one in four African-American adults cannot afford their asthma medications and one in five Hispanic adults cannot afford their asthma medications (CDC, 2013). A price comparison of medications prescribed to treat the asthmatic patient shows the reader an average cost to control asthma symptoms (see Table 4). In addition, to improve asthma management and extended resource options, each parent and child were assigned to a case manager. The intent of this team effort was to assist the parent with grant funded vouchers available to them for the purchase of medications, a nebulizer machine, and transportation to the clinic.

The benefits of this project are demonstrated through the positive outcomes identified: quality asthma education provided following evidence-based practice, decreased healthcare costs associated with an increase in medication use; a decrease in ED, hospital, and clinic visits for asthma; decreased number of asthma exacerbations; and increased parent and patient knowledge about asthma and self-management. With improved asthma outcomes, the population diagnosed

with asthma will have fewer episodic visits for distress and the visit will shift from episodic care for problems to preventative care. Clearly, the cost to implement this project was insignificant in comparison to the potential amount of healthcare costs saved from hospital admissions, ED visits, and medication adherence.

Mission, Vision, and Goals

The vision of this project was to positively impact asthma management, control, and outcomes in the pediatric population served in the clinical care setting. Through successful collaboration, leadership, and communication amongst the healthcare team and all the stakeholders, the primary investigator envisions a healthier future for the pediatric population in this valley. The mission statement of this project was to provide safe, patient-centered, accessible, and cost-effective asthma healthcare services in a respectful and inclusive manner, with special considerations for the medically underserved population. Additionally, the goals of this project were to increase the parent (s) and child's knowledge related to asthma control and to enhance self-management skills.

Process, Objectives, and Outcomes

Zaccagnini and White (2011) define objectives as "clear, realistic, specific, measurable, and time-limited statements of the actions which, when completed, will move the project towards its goals" (p. 468). According to Zaccagnini and White (2011), goals are where you want to be; objectives are how you get there. The objectives must be specific to the target population, must be measurable, attainable, realistic, and must be timely to get the project accomplished within the designated time frame (Zaccagnini & White, 2011).

The objectives of the capstone project were to evaluate the impact of the intervention on asthma control and management; evaluate the impact of the intervention on the number of ED

visits and hospital admissions for asthma symptoms; evaluate the impact of the intervention on the parents knowledge and self-management of asthma; and to develop an asthma educational teaching plan (see Appendix B) for the parent, patient, and family members, and nursing staff in all clinical settings. Consistent monitoring of the processes, objectives, and outcomes (see Table 5) assisted the primary investigator in identifying any areas needing revision in the education initiative. Monitoring the outcome measures of interest during the project timeframe included identifying the number of ED visits for asthma; the number of hospital admissions with a diagnosis of asthma; adherence to asthma medications; the effectiveness of the educational intervention; and an analysis of the Asthma Therapy Assessment Questionnaire (ATAQ) scores pre and post-intervention of the capstone project.

Logic Model

The intent of a logic model is to present stakeholders with a road map describing the sequence of correlated events, and connecting the need for the proposed capstone project with the projects desired results (W.K. Kellogg Foundation, 2004). Diagramming the proposed education project will help the reader to visualize and understand how individual and financial investments can be a factor to achieving the proposed project goals (2004). As mentioned by W.K. Kellogg Foundation (2004), the logic model brings project hypothesis and vision to life and clearly demonstrates the proposed inputs, constraints, activities, outputs, short and long-term goals, along with comparison benchmarks (see Appendix C). According to Zaccagnini and White (2011), inputs are resources needed to implement the project including personnel, finances, and facilities, while activities are what the project does to achieve outcomes. Outputs are the results of the project including the number of participants, the number of hours of instruction, the number of meetings, participation rates, and the number of hours of service

provided. In addition, outcomes can be viewed as short-term, long-term, and impact outcomes. Short-term outcomes measure the knowledge base or skill level, while long-term outcomes measure motivation and behavior changes. Finally, impact outcomes describe the result of the change on the population served by this project (Zaccagnini & White, 2011, pg. 480). The logic model guided this capstone project with a time-framed and consistent evaluation of the short-term (on-site asthma education), and long-term goals (reduction in asthma events, increased asthma knowledge), constraints (time), outputs (parent participation), and inputs (education and training, ATAQ completion) from the date of implementation to the completion of this capstone study project.

Population and Sampling Parameters

Through convenience sampling, the population for this project included 38 parents of children five through 17 years of age, with a clinical diagnosis of asthma and who received care at the family practice clinic. Of the 38 participants, 22 (58%) were female, and 16 (42%) were male. The majority of participants (76%) received Medicaid insurance, suggesting that these children lived in families at or below the federal poverty level and 64% of the children were from single-parent households. The demographics of the study population were summarized and analyzed (see Table 6).

Participants were identified through scheduled visits in the clinic for asthma symptoms between March and June of 2014. Before the initial visit with the provider, the primary investigator followed the following steps sequentially for each study participant: 1) described the project to the parent and child in English or Spanish, 2) obtained a signed consent to be part of the project, and 3) completion of the ATAQ tool (see Appendix D) in either English or Spanish by the parent. To accommodate all non-English speaking parents and children, a trilingual

translator was available in the clinic from 8:00 am to 4:00 pm, Monday through Friday. The translator followed all Health Insurance Portability and Accountability Act (HIPAA) guidelines during any and all conversations with the parent and child. Inclusion criteria for the project study included:

1. children five through 17 years of age with a clinical diagnosis of asthma;
2. an ATAQ score above two;
3. one clinic visit for asthma within the past 12 months;
4. one ED visit and or hospital stay for asthma in the past twelve months;
5. language of choice: English, Spanish, Kanjobal

Exclusion to participate in the study included:

1. no diagnosis of asthma
2. over 17 years of age
3. no hospital or ED admission for asthma in the past 12 months

Setting

The setting for this research project took place in a rural six-provider ambulatory clinic located in the southern part of the state. This clinic is federally funded, not-for-profit, and staffed with a mix of physicians, family nurse practitioners, physician assistants, registered nurses, licensed practical nurses, medical assistants, and support staff. As a community health center and certified Federally Qualified Health Center (FQHC), this organization has been part of the success of America's healthcare system by helping to: reduce income and ethnic health disparities in the poorest and most challenged communities in the valley; improve access that is convenient, affordable, and offers a range of on-site services for all ages (VWHS, 2013). In

addition, this clinic is committed to serving the medical needs of any and all persons presenting for care, therefore, no one is ever turned away.

Throughout the course of this project, all educational offerings were given in the clinic training room allowing for privacy, space accommodation for up to five people, and readily available information on asthma management. The educational materials included: what is asthma, asthma triggers, inhaled medications, asthma control, how to use an inhaler, spacer use, preparing and cleaning spacers, and multidose inhaler use (MDI's). In addition to the educational materials, a lung model and placebo inhalers were donated to the project by the clinic pharmacy for training purposes. The workflow and patient throughput was not affected by the project as all patient care rooms were never utilized to provide any training reflective of this project.

EBP Methodology and Measurement

A quantitative research design with two-phases prior to and after an educational intervention comparison of the independent variable (education) and the dependent variable (asthma control and management) was implemented. The data were compared statistically using descriptive analysis and the independent t-test for dependent means to see if there was a difference between pre-educational and post-educational asthma measures. The outcomes were measured by inputting data collected from the ATAQ tools and the patient's electronic medical record (EMR) into an excel spread sheet and eventually into the Statistical Package for Social Sciences version 22 (SPSS v. 22). Estimating the sample size needed to minimize the risk and or likelihood of a type II error, the primary investigator reviewed the four components of power analysis: the significance criterion, power, population effect size, and sample size (Polit, pg. 127). According to Polit's table of power analysis (pg. 421) the sample size ideal for a moderate

effect size of α=0.5 with a power of 0.80, this project would have required a minimal population size of 100 participants.

Measurement

The demographic variables assessed were: marital status of parents, number of siblings in the family, age, and insurance status. Outcome measures were defined as pre and post-education changes in the ATAQ scores and equipment technique. This proposed practice change within a rural clinic incorporated asthma self-management educational to the parent (s) and child at the time of the clinical visit. Following the NHLBI asthma guidelines, the educational intervention offered to the parent (s) included: the basic facts about asthma, definition of well-controlled asthma, medication for asthma, how to handle signs and symptoms of worsening asthma, and asthma triggers. Baseline and post-intervention measurements were gathered through the use of the ATAQ. This instrument is a brief self-administered questionnaire designed to assess level of asthma control and identify possible disease management problems. The resulting control index ranges from 0 to four and reflects the level of control in week four (Peters et al., 2005). Asthma control was assessed by using six questions about recent (past four weeks) or chronic (past 12 months) symptoms and consequences of asthma. For each completed survey, a score of 0 on the control domain indicates no control issues, and a nonzero score suggests control problems (2005). The educational intervention (see Appendix B) and all information shared with the parent (s) was offered in English, Spanish, and Kanjobal with the exception of unavailable literature in Kanjobal.

The educational sessions were started after each outpatient visit in the clinic and involved a face-to-face session with the primary investigator for data collection and implementation of the intervention. Each session lasted approximately 30 minutes. The sessions followed a structured

schedule that included verbal and written instruction and addressed the following points: what asthma is and what its symptoms are; use of the ATAQ tool at each clinic visit, environmental control and how to avoid asthma triggers; the importance of quick relief inhaled medicine, and long-acting β2 agonists for preventive disease management; how to obtain asthma medications via a voucher system and how to overcome the limitations; inhalation technique assessment and correction of any mistakes observed; the need for using a spacer when inhaled rescue medications are delivered by a metered dose inhaler; and explanation and additional instruction as needed.

Each parent was asked to verbally demonstrate the inhalation technique, while the child (patient) was asked to demonstrate their inhalation technique using a placebo. For metered dose inhalers, patients were evaluated on the correctness of the following steps: 1) shaking the inhaler before using it; 2) exhaling normally before using the inhaler; 3) holding the inhaler at an appropriate distance (3-5 cm) from the lips if a spacer is not used or, if a spacer is used, placing the inhaler in the mouth and creating an adequate seal with the lips; 4) inhaling slowly and deeply after squeezing the inhaler; and 5) performing a breath-hold of at least 10 seconds after inhalation. For dry powder inhalers, patients were evaluated on the correctness of the following steps: a) exhaling normally before using the inhaler; b) placing the inhaler in the mouth and creating an adequate seal with the lips; c) inhaling as forcefully and deeply as possible; and d) performing a breath-hold of at least 10 seconds after inhalation(NHBLI, 2012). The patients' inhalation technique for each type of device was considered correct only if all the steps were properly performed. During each educational intervention, the primary investigator observed a desire to learn and an openness to ask questions relevant to asthma management and control from both the parent (s) and patient. Additionally, the parent (s) and patient were eager to attend

each learning intervention in an effort "to breathe better and feel normal." The comments received from several parents were positive: "we feel important, no one has ever given us so much education and training," "we don't have to be scared of having asthma anymore," "I don't have to hide my inhaler in school, I am going to teach my teacher about my inhaler." At the end of each educational session, the primary investigator reviewed the ATAQ scores with the parent (s), family member, and the child. Following the initial educational intervention, all other sessions were followed by a 30 minute nurse visit in the clinic at two and four weeks after inclusion into the study. Through the patients EMR, the primary investigator monitored the number of ED visits, PCP visits, and hospitalizations for asthma.

Instrumentation Reliability and Validity

The ATAQ was used to assess asthma control in the study population. The ATAQ consists of six questions that require numeric rating of severity of asthma symptoms. Each element in the questionnaire is dichotomized; zero points are good, any point is bad: 0=well controlled, 1-2=not well controlled, and 3-4=very poorly controlled. In a study discussed by Boulet, Hollie, and O'donnel (2009) the validity and reliability of the ATAQ tool was demonstrated by an analysis showing sufficient internal consistency of Cronbach's alpha 0.7617 for asthma and Pearson's correlations indicated a good test-retest ($r = 0.6421$, $p = 0.0002$) for asthma. In addition, Diett et al, (2009) found that the ATAQ demonstrated good internal consistency and strong relationships with existing validated measures of childhood health status, asthma impact, and health care utilization.

An identified factor imposing potential threats to validity and reliability to this capstone project would be that of missing data. When there are missing values, the accuracy of statistical power is questioned as is the effectiveness of the intervention (Polit, 2010). The quality of the

evidence gathered during the research project can be compromised when there are values missing. Polit (2010) contends that missing data in a research project can be influenced by attrition of participants, Hawthorne effect, non-response bias, cohort bias, data entry errors such as the incorrect International Classification of Diseases 9 (ICD-9) codes, and construct validity.

Protection of Human Rights

Following exempt status approval from the Institutional Review Board (IRB) at Regis University (see Appendix E) and approval to use the ATAQ tool from Felicia Allen-Ramey, PhD, Executive Director, Global Health Outcome (see Appendix F), this capstone project was implemented on March 4, 2014. Attachments to the IRB application included a letter of support (Appendix G) from the Chief Administrator Officer where the research study was conducted, and the completion of the Collaborative Institutional Training Initiative (CITI) training, (see Appendix H). The primary investigator followed the guidelines recommended by the IRB of Regis University with the protection of all participants maintained throughout the project: HIPAA was consistently followed; all information gathered on each subject was coded and identifying information was removed; demographics, medical history, and educational interventions were updated in the child's EMR. All data collected for this project was entered in a secure password protected computer and will be destroyed after three years. Prior to implementing the study with the parent (s) and child, the primary investigator informed all participants of the nature of the study, the benefits, a review of the consent form (see Appendix I) in English or Spanish with a signature signed prior to the intervention, and voluntary status to participate with the option to opt out at anytime. The potential risk identified by the primary investigator was deemed minimal to include anxiety from participation, resulting in participant attrition.

Patients, families, and healthcare professionals sometimes face difficult decisions about medical treatments for asthma that involve moral principles or religious beliefs. The importance of meeting the linguistic and cultural needs of every patient and family member were critical during every aspect of the educational intervention. Any and all decisions made by the parent and or child were respected. Through the duration of this project, this primary investigator was an influential role model who demonstrated nonmaleficence, justice, autonomy, and beneficence with each and every parent and patient before, during, and after any patient education was given. During all parent and patient interactions in the clinic, the primary investigator abided by the following:

- The parent, patient and family members were treated fairly, equally, and with respect;
- The parent, patient and family members were aware of all treatment options, resources, and given the opportunity to make their own medical decisions; and
- All educational materials were taught to the parent and patient in their spoken language.

Data Collection and Treatment Procedure

The practice problem identified in this particular part of the state was the prevalence of asthma amongst the pediatric population, and the subsequent lack of asthma education and asthma control resulting in high healthcare costs and negative outcomes. The development of a timeframe for the project (see Appendix J) demonstrates the processes required, implemented, and completed. Initially, the capstone project began with a meeting amongst the project team: the primary investigator, clinic lead nurse, clinic manager, support staff member, and two providers. Participants meeting the criteria to be enrolled in the study were given a complete description of the capstone project to include the goals, objectives, and benefits. Upon approval

to participate in the study, a consent form was signed by the parent and the educational intervention began. The first step was to have the parent complete the ATAQ form prior to the educational intervention. Following the initial educational intervention and all sessions following, pre and post-intervention data was collected and analyzed to include the number of asthma attacks, inhaler use, awareness of triggers, and missed days of school. Pre-intervention data was collected from the patients EMR: the number of clinic visits for asthma, the number of ED and or hospital admissions for asthma, a request for medication refills, and the number of doctor excuses for missed school due to asthma.

Findings and Results

The primary investigator utilized the SPSS v. 22 and Excel 2010 to analyze additional outcome measures pre and post-educational intervention. Asthma educational outcomes and the ATAQ scores pre and post-intervention showed significant improvement in the level of asthma awareness, inhaler technique, control, and management (ATAQ pre-intervention p=0.047, post-intervention p=<0.001), asthma episodes pre-intervention (M=11.25, SD= 3.015, p=0.452) statistically decreased post-intervention (M=3.37, SD=1.584, p=<0.001). Medication adherence (see Figure 1), asthma management (see Figure 2), and the basics of asthma (see Figure 3) have been calculated using Excel 2010. Clearly, all three areas show improvement following the implementation of the asthma educational intervention as demonstrated by an increase in the percentages for medication adherence (72% to 93%), inhaler technique (77% to 94%), and asthma basics: triggers (78% to 95%), sign and symptoms (89% to 100%), medication use (67% to 95%), and understanding asthma (72% to 89%). On average, the children had been diagnosed with asthma at approximately four years of age (M=4.4, SD=2.7). More than half of the children had a previous ED visit for asthma (53%, n=20), but only 21% had been hospitalized in the past

year because of their asthma (*n*=8). Eighty-four percent of the parents (*n*=32) reported that their child was not exposed to second-hand smoke in the home. Daily asthma medications for almost all of the children were prescribed (97%, *n*=37), including short-acting (86%, *n*=33) and long-acting (71%, *n*=8) inhaled corticosteroids; with only 48% (*n*=18) of the parents reported that the study participants took the medications as directed by their provider. Ninety-five percent (*n*=37) of the parents reported that their child had not been using a spacer at home, nor was one ever recommended for use. An incorrect inhalation technique identified during the first evaluation was predictive of a favorable response to the educational intervention. The number of wheezing episodes (see Figure 4) experienced by the children during the three months before participating in the study (*M*=11.21, *SD*=3.0159) significantly decreased post-intervention (*M*=3.37, *SD*=1.584; *p*=<0.001) (see Figure 5). In addition, the number of missed school days pre-intervention (*M*=3.29, *SD*= 1.250) also decreased post-intervention (*M*=1.34, *SD*=0.781). Utilizing the ATAQ tool prior to and following the educational intervention clinically improved the confidence and self-management skills of the parent and child. The findings answer the PICO question through the evidence collected indicating that an educational intervention does improve parental knowledge, and improves asthma management, and control.

Limitations, Recommendations, Implications for Practice

Limitations

Limitations to the outcome measures include: ED visits and hospitalization data did not include an ICD-9 code for asthma; short amount of time to complete the project; and a small sample size (did not reach power). More research is needed with a larger sample size so that appropriate statistical tests can be used to validate findings. Larger samples can determine significance of findings that can be used to support current literature and further improve

outcomes within this clinic, and possibly other communities. Additionally, a number of misconceptions about asthma among the general public, even those at risk for asthma or who have asthma themselves, continues to exist. During the project, the primary investigator observed that parents and often physicians found it more acceptable for the diagnosis to be labeled "allergies," even when all symptoms met the criteria for a diagnosis of asthma. By educating the parent (s) of children diagnosed with asthma, the general public, and the health care team on the basics of asthma, management and guidelines, the misconceptions could be decreased or at best eliminated, resulting in improved asthma outcomes.

Recommendations

The asthma epidemic provides a unique opportunity for change. No public health problem better illustrates the need for a sustained, coordinated, and multi-organization effort (National Heart, Lung and Blood Institute, 2007). Continuing the educational intervention in the clinic setting will enhance the knowledge of patients, nursing staff, and providers about evidence-based practices aimed at improving asthma outcomes in the population presenting to the clinic for asthma care**.** Although the study was brief, the outcome measures analyzed showed statistical and clinical differences. This project impacted one of 13 clinics. The recommendation would be to implement a nurse-led asthma educational intervention in every clinic governed by the organization where this study was done. Continuing the educational intervention in the clinic setting will enhance the knowledge of patients, nursing staff, and providers about evidence-based practices aimed at improving asthma outcomes in the population presenting to the clinic for asthma care**.** The role of the primary investigator will be of importance in educating the internal and external stakeholders on the importance of continuing the asthma educational initiative by clearly communicating the outcomes from the capstone study.

Implications for Change

The attention to acute and chronic illnesses in the rural clinics is of immediate need. Realistically, the patient clinically diagnosed with asthma can be managed with safe, cost-effective coordination of care. The study's findings have implications for nursing practice within a clinic setting. Understanding the educational needs of the parent and child with asthma, as well as treatment barriers to comply with asthma guidelines is important in developing programs to promote control, management and adherence such as an asthma registry, group visits for the parent and child, and hospital rounds in an effort to identify the patient admitted for asthma. The capstone study also leads the way for further research with allergy testing and asthma, and the role of spirometry and asthma outcomes. Adding a nurse educator (NE) to each care team offers the opportunity to lobby at the local and state level on the burden of asthma faced by a vulnerable, underserved population in this valley. Also, the NE can get involved with a coalition to lobby for 1) improving the surveillance of asthma, 2) mandated training health professionals about asthma management, and 3) public awareness (CDC, 2012).

Conclusion

It is indisputable that health care costs in America have been rising to the point of being unmanageable. As healthcare costs continue to rise, the solutions to this chronic issue may take years to overcome and the hardships will continue to impact the people of this valley. An improvement in asthma management is a complex task, requiring asthma self-management education programs coupled with educational reinforcement and simplified treatment plans. Good communication skills among the healthcare team and the implementation of patient education are also central for improving asthma outcomes (Gillissen, 2007). Overall, community collaboration and partnership with key stakeholders, local state representatives, and community

members will help influence measures aimed at improving the health of the pediatric and adult population clinically diagnosed with asthma in this area of the state. This capstone project signified the importance of identifying and developing cost-effective clinical strategies to improve asthma management within a clinic setting; implementing an educational program specific to the parents of children with asthma; and the evaluation of innovative interventions aimed at improving asthma outcomes. There was significant improvement in the level of asthma awareness, inhaler technique, control, and self-management. In addition, there were no identified ED or hospital visits during this projects time frame. This study suggests that an outpatient education program for asthma patients improves the level of asthma control and self-management.

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Appendix A

Knowles' 5 Assumptions of Adult Learners				
Self-Concept	Adult Learner Experience	Readiness to Learn	Orientation to Learning	Motivation to Learn
As a person matures his/her self concept moves from one of being a dependent personality toward one of being a self-directed human being	As a person matures he/she accumulates a growing reservoir of experience that becomes an increasing resource for learning	As a person matures his/her readiness to learn becomes oriented increasingly to the developmental tasks of his/her social roles	As a person matures his/her time perspectives changes from one of postponed application of knowledge to immediacy of application, and accordingly his/her orientation toward learning shifts from one of subject-centeredness to one of problem centeredness	As a person matures the motivation to learn is internal

Appendix B

Asthma Education Plan

Topic	Teach	Review	Intervention	Parents/patient return demonstration/verbal acknowledgement
Basic facts about asthma	What is asthma What causes asthma What are the signs and symptoms of an asthma attack What is asthma control	A chronic disease with narrowing of the airways in the lungs making it hard to breath. As the air moves through your lungs, the airways become smaller, like the branches of a tree are smaller than the tree trunk. During an asthma attack, the sides of the airways in your lungs swell and the airways shrink. Less air gets in and out of your lungs. Exposure to triggers: tobacco smoke, dust mites, animal dander, indoor mold, wood smoke, cockroach allergens, air pollution, cold air, weeds/trees/grass, strenuous exercise, respiratory infections, common food allergies An asthma attack may include coughing, chest tightness, wheezing, and trouble breathing. Few asthma symptoms resulting in: • No coughing or wheezing • No shortness of breath • No waking up at night • Normal physical activities • Normal lung function	Picture of normal and inflamed airway Lung model Review how to control asthma triggers: 1. Do not smoke around child 2. Wash bedding weekly with hot water 3. Remove rugs and carpet from bedroom 4. Avoid strong smelling perfumes 5. Keep furry animals out of the home 6. Do not keep food in the bedroom, exposed in other areas of the home 7. Keep moldy surfaces clean and dry 8. High pollen season: allergy medication may be needed 9. Refrain from using a wood stove and or fireplace	Assess parents understanding of asthma and clarify any fears or misconceptions Parent will be able to verbalize asthma triggers and how to avoid them Parent will be able to verbalize early signs and symptoms and when to seek medical care or urgent care Parent verbalizes the meaning of asthma control and positive outcomes
How is asthma treated	Role of medications	Describe *quick relief* versus *long-term* medications	Quick relief: short acting beta agonist giving quick relief of symptoms by relaxing the muscles around the airways. Long-term: prevents symptoms by reducing inflammation.	Parent verbalizes: • the difference between short acting and long-term medications • importance of adherence • possible side effects

			Typically taken on a daily basis.	
	Taking medications	Demonstrate: • inhaler technique • diskus technique • use of metered dose inhaler and spacer • the set up of a nebulizer treatment • Review the importance of medication adherence	Tools supplied by pharmacy vendors for teaching use	Parent will demonstrate the procedure for the medication prescribed by the provider Parent will demonstrate the set-up for a nebulizer treatment, spacer cleaning and storage of medications

Appendix C

Logic Model

Inputs	Activities	Outputs	Short Term	Long Term	Benchmark State of Colorado
Project Team Dedicated staff Education and training Asthma Educational material in English and Spanish Training room Supplies: spacer IRB approval	Evaluate project plan IRB approval Comprehensive training focused on asthma management Staff education on NHLBI asthma EBP guidelines	Parent and patient participation in educational offerings: assess asthma control at every visit even for non-related asthma symptoms assess self-management skills at every visit utilize internal and external resources to improve asthma control	Identify number of asthma patients seen at SBMC On-site clinical education following every visit	Post education: Parent and patient competent in asthma self-management: Reduction in asthma events and triggers adherence to medication use Reduction in asthma related ED visits and hospitalizations Increased school attendance Decrease healthcare costs related to asthma Continue to monitor ATAQ at every visit	Data not collected Routine care in past 12 months ED visit for asthma Adherence to medication % of population who received the Flu shot

Appendix D

Pediatric/Adolescent Asthma Therapy Assessment Questionnaire

Pediatric/Adolescent Asthma Therapy Assessment Questionnaire

Patient Name:_____

ID Number:_____

Physician Name:_____ Date:_____

Please have the parent or guardian complete this questionnaire.

INSTRUCTIONS: Check 1 answer to each question and enter point value (0 or 1) on line

		Control Issues	Other Issues
1.	**In the *past 4 weeks*, did your child:**		
a)	Have wheezing or difficulty breathing when exercising? ☐ Yes (1) ☐ No (0) ☐ Unsure (1)	____	
b)	Have wheezing during the day when **not** exercising? ☐ Yes (1) ☐ No (0) ☐ Unsure (1)	____	
c)	Wake up at night with wheezing or difficulty breathing? ☐ Yes (1) ☐ No (0) ☐ Unsure (1)	____	
d)	Miss days of school because of his/her asthma? ☐ Yes (1) ☐ No (0) ☐ Unsure (1)	____	
e)	Miss any daily activities (such as playing, going to a friend's house, or any family activity) because of asthma? ☐ Yes (1) ☐ No (0) ☐ Unsure (1)	____	
2.	**Does your child use an inhaler or a nebulizer for *quick relief* from asthma symptoms?*** ☐ Yes ☐ No ☐ Unsure		
	(If Yes) In the **past 4 weeks**, what was the **greatest number of times** in 1 day your child used this inhaler/nebulizer?		
	0 ☐ (0) 5 to 6 ☐ (1)		
	1 to 2 ☐ (0) More than 6 ☐ (1)		
	3 to 4 ☐ (1)* Enter score _____	____	
3.	**Has your child ever had a prescription for an asthma medicine that is NOT used for quick relief but is used to *control* his/her asthma?** ☐ Yes ☐ No ☐ Unsure		
	(If Yes or Unsure) What best describes how your child takes this medicine now?		
	Takes it every day ☐ (0) Only takes it when he/she has symptoms ☐ (1)		
	Takes it some days, but not other days ☐ (1) Never takes it ☐ (1)		
	Used to take it, but now does not ☐ (1) Enter score _____		____
4.	**Are you dissatisfied with any part of your child's *current* asthma treatment?** ☐ Yes (1) ☐ No (0) ☐ Unsure (1)		____
5.	**Do you believe that:**		
a)	Your child's asthma was well controlled in the **past 4 weeks**? ☐ Yes (0) ☐ No (1) ☐ Unsure (1)	____	
b)	Your child is able to take his/her asthma medicine(s) as directed? ☐ Yes (0) ☐ No (1) ☐ Unsure (1)		____
c)	Your child's medicine(s) is useful for controlling his/her asthma? ☐ Yes (0) ☐ No (1) ☐ Unsure (1)		____
6.	**During this office visit, would you like the doctor to discuss:**		
a)	Different types of drugs available to control asthma? ☐ (1)		
b)	Your child's asthma treatment options? ☐ (1)		
c)	How your child prefers to take his/her asthma medicine(s)? ☐ (1)		
d)	Other issues? ☐ (1)		
	Enter score _____		____
	Add numbers in the light blue area and enter total SCORE here. TOTAL _____	____	
	Add numbers in the dark blue area and enter total SCORE here. TOTAL _____		____
	If either SCORE is 1 or greater, discuss questionnaire with your doctor.		

*This reflects a lower threshold to identify potential control problems than was used in the ATAQ validation studies. This modification was designed to encourage patients and providers to discuss how asthma medications are being used.

MERCK

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Appendix E

Institutional Review Board Approval

REGIS UNIVERSITY

Academic Grants

3333 Regis Boulevard, H-4
Denver, Colorado 80221-1099

303-458-4206
303-964-5528 FAX
www.regis.edu

IRB – REGIS UNIVERSITY

March 6, 2014

Denise Trujillo
611 Brown Avenue
Alamosa, CO 81101

RE: IRB #: 14-128

Dear Ms. Trujillo:

Your application to the Regis IRB for your project, "An Evaluation of the Effectiveness of an Asthma Educational Initiative in A Rural Clinic," was approved as an exempt study on March 4, 2014. This study was approved per exempt study category of research 45CFR46.101.b(#2).

The designation of "exempt" means no further IRB review of this project, as it is currently designed, is needed.

If changes are made in the research plan that significantly alter the involvement of human subjects from that which was approved in the named application, the new research plan must be resubmitted to the Regis IRB for approval.

Sincerely,

Patsy Cullen

Patsy McGuire Cullen, PhD, PNP-BC
Chair, Institutional Review Board
Professor & Director
Doctor of Nursing Practice & Nurse Practitioner Programs
Loretto Heights School of Nursing
Regis University

cc: Dr. Colleen McCallum

A JESUIT UNIVERSITY

Appendix F

ATAQ Instrumentation Approval from Merck & Co.

Merck & Co., Inc.
Global Human Health
PO Box 4
West Point, PA 19486

November 25, 2013

Denise Trujillo, MSN, RN
DNP Student
Regis University
611 Brown Avenue
Alamosa, CO 81101

Dear Ms. Trujillo:

I am writing in response to your recent request for use of the pediatric version of the Asthma Therapy Assessment Questionnaire (ATAQ), which is the exclusive property of Merck & Co., Inc. We are happy that you find this information valuable. Merck is pleased to grant you permission to use the pediatric/adolescent version of the Asthma Therapy Assessment Questionnaire (ATAQ). This permission applies to a non-exclusive, inclusion of the survey as a measure of asthma control in the capstone project to assess the effectiveness of an asthma educational intervention for parents of children diagnosed with asthma in one of our clinics.

The ATAQ instrument is being provided for your use as a measurement tool. The instrument should not be sold for profit by you or other entity associated with the project. In addition, any requests for the ATAQ instrument resulting from your use of the instrument should be directed to Merck & Co., Inc.
Should you use any or all of the questions and response categories contained in the ATAQ instrument, the following statement must be included:

If you would like to use this material for some other purpose, please contact me to discuss.

Thank you again for contacting Merck with your request.

Sincerely,

Felicia Allen-Ramey, PhD
Executive Director, Global Health Outcomes

Appendix G

Agency Letter of Support

VALLEY-WIDE HEALTH SYSTEMS, INC.
SIERRA BLANCA MEDICAL CENTER
106 BLANCA AVENUE, SUITE 300, ALAMOSA, COLORADO 81101 • (719) 589-3658

November 13, 2013

To Whom It May Concern:

Sierra Blanca Medical Clinic serves the medically underserved population in the San Luis Valley. It will be an opportunity to provide asthma education to the patient's coming into our clinic for medical care and respiratory issues. Our organization welcomes the *Educational Initiative* brought forth by Denise Trujillo, MSN, RN. As a small organization, there is not an IRB committee. The approval from Regis University IRB Committee will suffice the requirements to perform any asthma education in our clinical setting.

Our team is excited to see the outcomes of the long awaited educational process for those suffering with asthma. Expanding the knowledge of the patient and parents will do wonders for their health and well being!

Should you need any further assistance or questions asked, please feel free to contact me directly.

Sincerely,

Alonzo Payne
Chief Administrative Officer
Valley-Wide Health Systems
126 Market Street
Alamosa, Colorado 81101
719-589-3658

Appendix H

CITI Collaborative Institutional Training Initiative

Human Research Curriculum Completion Report

Printed on 11/23/2012

Learner: Denise Trujillo (username: truji632)

Institution: Regis University

Contact Information Department: Nursing

Email: truji632@regis.edu

Social Behavioral Research Investigators and Key Personnel:

Stage 1. Basic Course Passed on 11/23/12 (Ref # 9208961)

Required Modules	Date Completed	
Introduction	11/20/12	no quiz
History and Ethical Principles - SBR	11/20/12	4/5 (80%)
The Regulations and The Social and Behavioral Sciences - SBR	11/20/12	4/5 (80%)
Assessing Risk in Social and Behavioral Sciences - SBR	11/20/12	4/5 (80%)
Informed Consent - SBR	11/23/12	4/5 (80%)
Privacy and Confidentiality - SBR	11/23/12	5/5 (100%)
Regis University	11/23/12	no quiz

For this Completion Report to be valid, the learner listed above must be affiliated with a CITI participating institution. Falsified information and unauthorized use of the CITI course site is unethical, and may be considered scientific misconduct by your institution.

Paul Braunschweiger Ph.D.

Professor, University of Miami Director Office of Research Education CITI Course Coordinator

Appendix I

Consent Form to Participate in a Research Study

Regis University
An Evaluation of the Effectiveness of an Asthma Educational Initiative in a Rural Clinic

You are invited to participate in a research study conducted by Denise Trujillo, a Regis University Doctor of Nursing Student, under the supervision of Dr. Colleen McCallum from the Loretto Heights School of Nursing at Regis University.

The purpose of this research study is to provide evidence-based education about asthma and to evaluate the effectiveness of the educational initiative. The goal of the study is to improve asthma management and control for your child diagnosed with asthma.

Your participation in the research study will include the following:

1. Completion of the Asthma Treatment Assessment Questionnaire
2. Following the clinical visit with the provider you and or your child will meet with Denise Trujillo (primary investigator) to review the following: asthma management and control and the use of medical equipment with a return demonstration
3. The time frame to assess and receive the education will be approximately 30 minutes

Risks and discomforts
The risks involved for the project participant are very minimal. They may include parental anxiety from your child being diagnosed with asthma. In an effort to minimize any risks, the investigator will provide the educational intervention in a calm, confidential setting with all information shared in a non rushed manner.

Potential benefits
Participants in this study will receive evidence-based asthma education from the investigator and the Lead Nurse in the clinic. The education provided will be aimed at asthma symptoms, triggers, medication adherence and side effects, when to seek medical care and the proper use of an inhaler, spacer, nebulizer, and diskus.

Protection of confidentiality
Any and all participant information will be kept confidential. All data collected for this study and all medical information entered into the participants electronic medical record will be secured in a password protected computer.

Voluntary participation
Your participation in this research study is voluntary. You may choose to withdraw your consent to participate at any time and will not be penalized in any way should you decide not to participate.

If you have any questions or concerns about this study or if any problems arise, you may contact the principle investigator Denise Trujillo at (719) 588-1236 or through email at truji632@regis.edu. You may also contact Dr. Colleen McCallum at (303) 229-5398 or cmccallu@regis.edu for any information regarding the research study.
If you have any questions or concerns about your rights as a research participant, please contact the Regis University Institutional Review Board at 303-458-4206.

Consent
I have read this consent form and have been given the opportunity to ask questions. I give my consent to participate in this study.

Participant's signature _____ Date _____

Denise Trujillo, MSN, DNP-Student _____ Date _____

Appendix J
Timeframe

Project Process	Course	Timetable
Step I: Problem Recognition Identified Need Problem Statement Literature Review PICO formation	NR701 NR706A NR707	Fall 2012 - Spring 2013
Step II: Needs Assessment Identify Population Identify key stakeholders, resources Organizational assessment Identify available resources Identify outcomes Team selection Cost-benefit analysis Define scope of project	NR 703 NR 704 NR 706A-B NR 707 NR 708 NR 711 NR 721	Spring 2013- Summer 2014
Step III: Goal, Objectives, and Mission Statement Goals Process outcomes/objectives Develop Mission statement	NR 707 NR 711 NR 721	Fall 2012- Summer 2013
Step IV: Theoretical Underpinning Theories of change Theories to support the project	NR 701 NR 707 NR 711 NR 721	Fall 2012-Summer 2013-Fall 2013
Step V: Work Planning Project Proposal Timeline Budget Project management	NR 706B NR 707 NR 708 NR 711 NR 712 NR 721 NR 722	Spring 2013-Summer 2014
Step VI: Planning for Evaluation Submit proposal for approval IRB submission to Capstone Chair review	NR 706B NR 707 NR 712 NR 722	Spring 2013-Summer 2014
Step VII: Implementation Submit IRB application to Regis University IRB Implement the project	NR 706B-C NR 707 NR 712 NR 722	Fall 2013 , Spring 2014, Summer 2014
Step VIII: Giving Meaning to the Data Meet with a statistician Input data for analysis	NR 702 NR 706C	Spring 2014-Summer 2014
Step IX: Utilizing and Reporting Results Written Dissemination Oral Dissemination Electronic Dissemination	NR799	Summer 2014-Fall 2014

Table 1

SWOT Analysis

Internal	Strengths	Weaknesses
	Seasoned nursing staff Interpreter (Spanish and Kanjobal) Evidence-based materials ATAQ tool Continuity of care National Jewish Health	Timeline to complete project Sample size of study population Language barrier Location
External	Opportunities	Threats
	Decrease ED visits Decrease hospital admissions EBP asthma education	Patient attrition Competition with local clinics Access to care

Table 2

Stakeholders

Stakeholders	
Internal Organization	External
Project Team Members	NJH Partnership

Case Management	Patient
Providers	Parent (s)
Medical Assistant	Hospital discharge planner
Executive Team	Pharmaceutical company
	Community members
	School Nurse, Public Health

Table 3

Project Budget Cost

Capstone Project Resources	Justification	Project Budget Cost	Actual Cost to Implement an Asthma

			Educational Initiative
DNP Investigator	Project Lead	Volunteered time	$45 x 40hrs: $1800
RN Lead Nurse	Educate the parent and child	$0-On staff	$17 x 40hrs: $680
Medical Assistant	Gives the parent/patient the ATAQ form during the clinical visit	$0-On staff	$14 x 40hrs: $560
Support Staff	Check-in patient	$0-On staff	$10 x 40hrs: $400
Interpreter: Spanish and Kanjobal	Accurate communication with the parent/child	$0-On staff	$20 x 40hrs: $800
Conference room	Private location to educate the parent and patient	$0-education will take place in the Lead Nurse office	$75 x each hour per educational session
Housekeeping		$0-contract in place with the organization	$850 per month
Asthma educational materials	Available at no cost in English and Spanish through on-line resources: CDC, NHLBI, NJH	$0-donated through National Jewish Health	$2000
Training on the capstone proposed project, ATAQ	Lead Nurse Medical Assistants (3) Provider	$17 x 2 hours = $34 $14 x 2 hours = $28 $250 x 2 hours = $500	$17 x 2 hours: $34 $14 x 2 hours: $28 $250 x 2 hours = $500
Total Cost		$562	$7727 estimated
Savings			$7165

Table 4

Medication Costs

Medication (Monthly)	Cost with Insurance	Cost Without Insurance	Difference
Zyrtec	$8	$10	+ $2
Advair Diskus	$50	$260	+ $190
Nasonex	$25	$156	+ $131
ProAir Inhaler	$10	$60	+ $50

Table 5

Process, Objectives, and Outcomes

Process	Objectives	Outcomes

Education on the basic facts about asthma: What is asthma What causes asthma Signs and symptoms Triggers What is asthma control Role of medications Taking medications Equipment technique	Evaluate the impact of the intervention on asthma control and management Evaluate the impact of the intervention on the number of ED visits and hospital admissions for asthma symptoms Evaluate the impact of the intervention on the parents knowledge and self-management of asthma Develop an asthma educational teaching plan for the: Parent, patient, and family members Nursing staff (Lead nurse) in all clinical settings Review: Reference education tools and references from NJH and NHLBI. Resources for spacers, placebos	ATAQ scores improved Asthma episodes decreased No ED or hospital admissions for asthma during the study Pre and post intervention ED visits Pre and post intervention hospital admissions Verbalized: Causes of asthma Signs and symptoms Triggers How to control asthma How to take medications An understanding of short acting and long acting meds Return demonstration: Inhaler, diskus, nebulizer, peak flow technique

Table 6

Demographics

Variable	N=	Percent
Gender		
Male	16	42
Female	22	58
Insurance		
Medicaid	29	76
HMO	3	8
United	6	16
Marital Status of Parents		
Married	14	36
Divorced	24	64
Number of siblings in household		
1 or 2	24	63
3 or greater	14	37
Age		
5	5	13
6	6	16
7	8	21
8	5	13
9	3	8
10	2	5
11	3	8
12	3	8
13	2	5
14	1	3
15	0	0
16	0	0
17	0	0

Figure 1

Medication Adherence

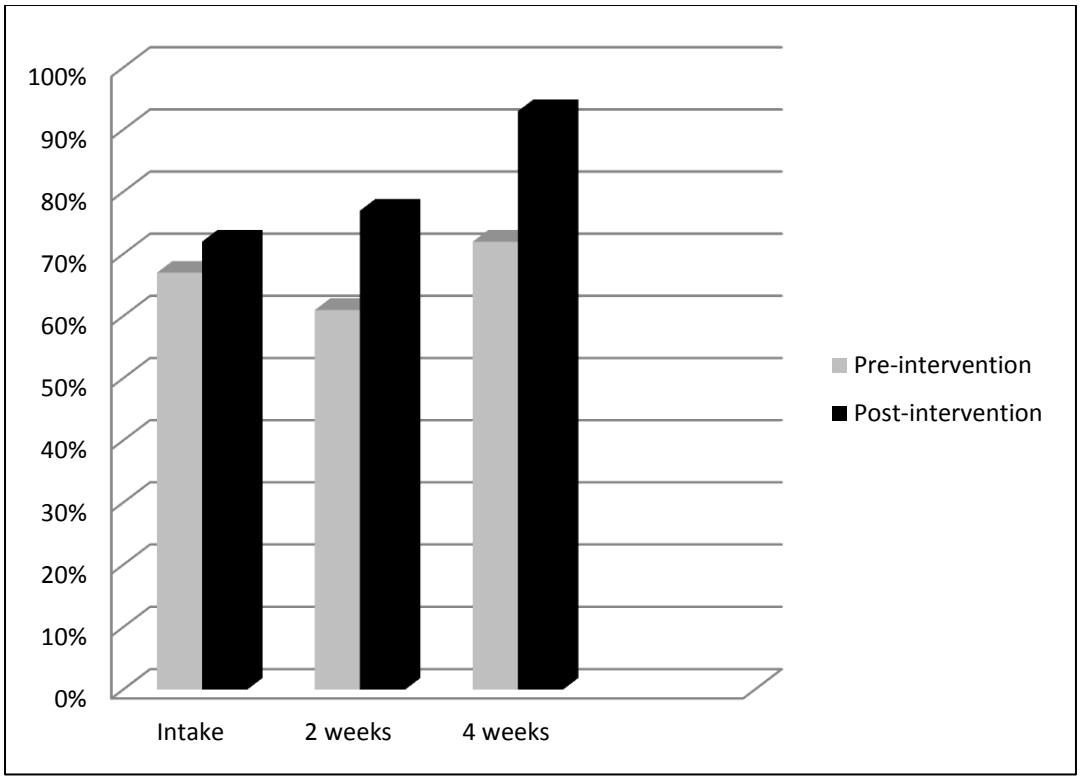

Figure 2

Asthma Management

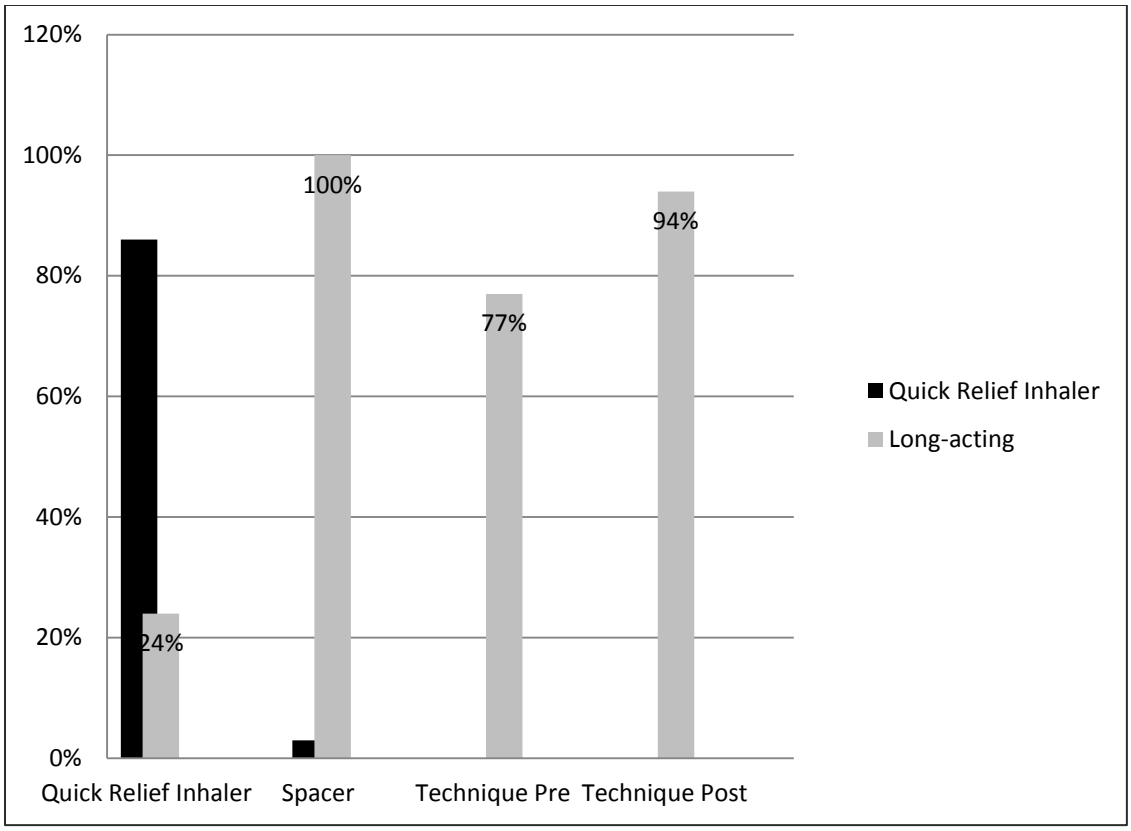

Figure 3

Basics of Asthma

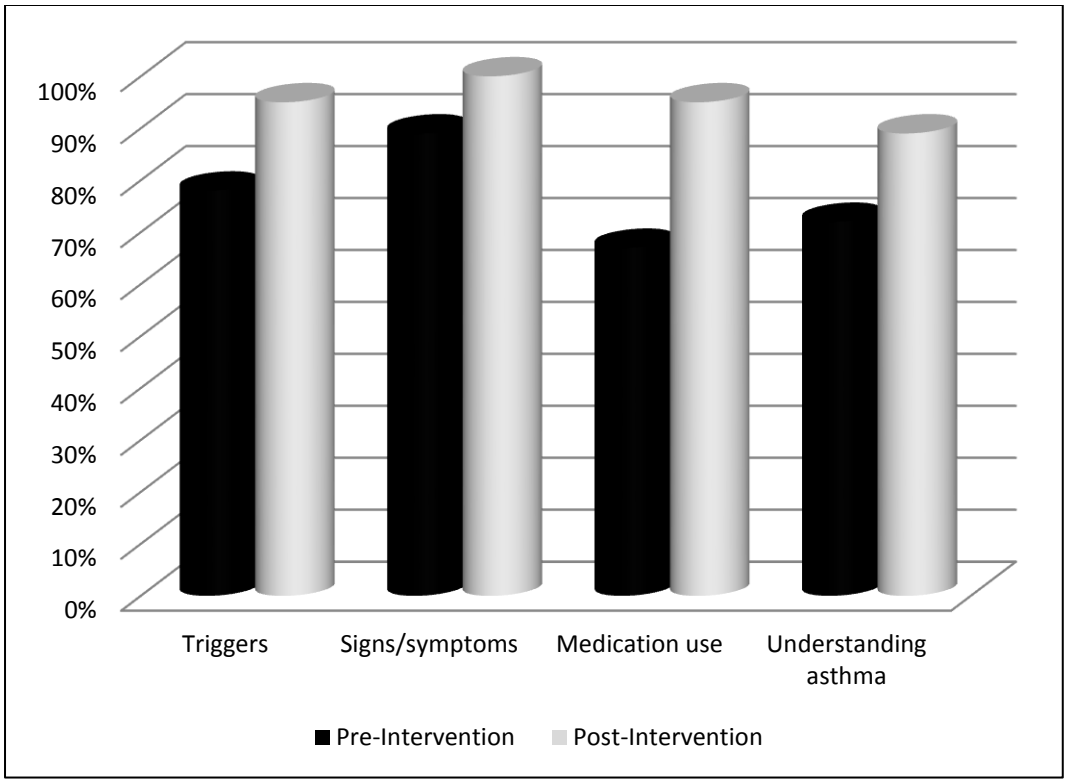

Figure 4

Frequency of Asthma Episodes

Pre-intervention

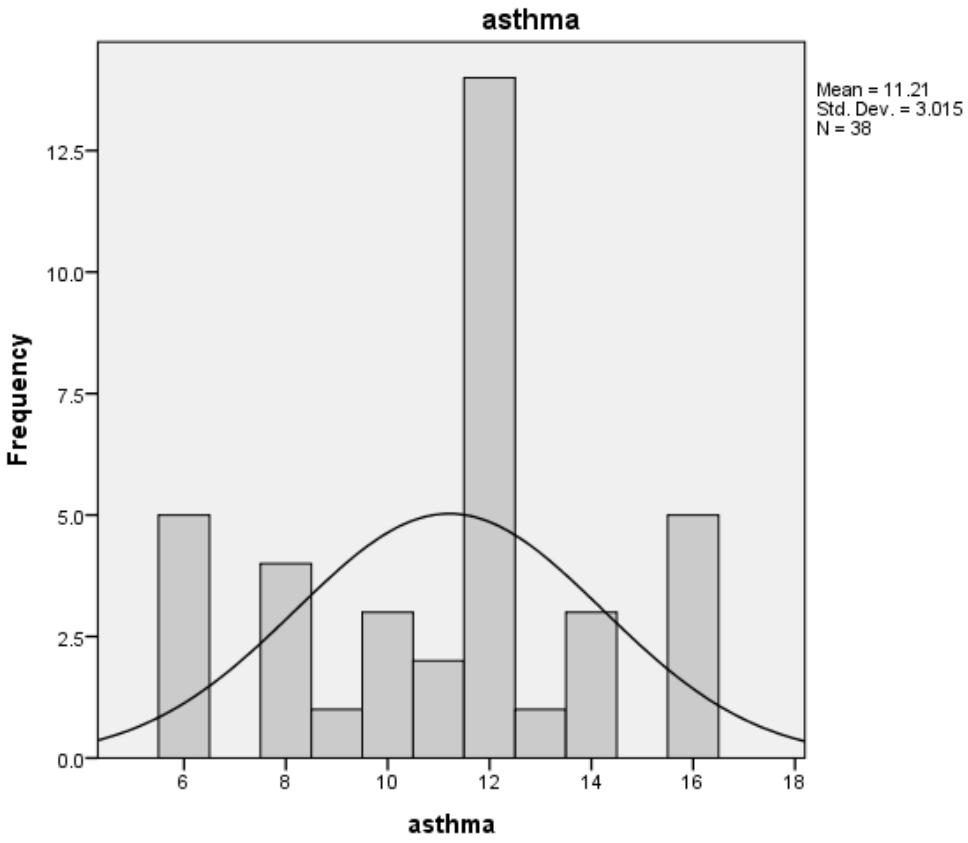

Figure 5

Frequency of Asthma Episodes

Post-intervention